With regard to claim 1, Chui describes an apparatus for block encoding of windows of digitally represented images comprising a *chain of lattices of lapped transforms with dyadic rational lifting steps (see figures 4-18 and refer for example to column 28, lines 4-25)*.

In regard to claim 9, Chui describes an apparatus for transforming M x M blocks of digital image intensities comprising *lapped transforms with overlapping factor K and having butterfly structures and lifting steps to generate M-channel uniform linear phase perfect reconstruction filter banks (see figures 4-18 and refer for example to column 28, lines 4-25)*.

. . . .

In regard to claim 12, Chui describes a method of block coding windows of digitally represented images comprising successive steps of processing the output of each step through a following step *in a chain of lattices of lapped transforms with dyadic rational lifting steps (see figures 4-18 and refer for example to column 28, lines 4-25)*.

It is difficult for Applicants to focus on the exact nature of this rejection because the Chui, et al. invention, albeit in the same technical field, is so different from the instant invention. The instant invention revolves around the use of lapped transforms, originally invented by H. Malvar, "Signal Processing With Lapped Transforms," (Artech House 1992). The Chui, et al. patent makes no reference to lapped transforms and no reference to Malvar. Undersigned counsel downloaded a text version of Chui, et al. and word-searched it electronically. None of the words "chain," "lattice" or "lattices," "lap" or "lapped," "lifting" or "lifting steps," "rational," or "butterfly" appear in the Chui, et al. patent. The only verbal overlap is the word "dyadic," which appears in the title of one reference to one of Dr. Chui's own papers which has nothing to do with the kind of lapped transforms at issue here.

Secondly, the Chui, et al. system is restricted to a customary 2-channel wavelet decomposition, the basic structure of which is well known in the art. In contrast, the instant

invention is generalized to M-channel systems. Chui, et al. also use only typical high-pass, low-pass wavelet decompositions and nowhere even mention lapped transforms.

Finally, and decisively, Claim 1 has a limitation to "dyadic rational lifting steps." As the text and the drawings make clear, this type of operation is very special. The entire theory of the lifting scheme was developed by W. Sweldens, "Lifting Scheme: a new philosophy in biorthogonal wavelet constructions," SPIE Proceedings, Vol 2569, pp. 68-79 (1995). Chui, et al. nowhere reference the use of lifting steps.

The foregoing arguments also apply to Claim 9. In addition, although the Chui, et al. patent refers to M x M blocks of data, it actually uses a transform which is only 2-channel. Thi instant invention, in contrast, uses M-channel systems to decompose M x M blocks of data, the functioning of which is quite different from that of Chui, et al. In addition, the scheme of the instant invention uses a "butterfly" structure and lifting steps, neither of which is even mentioned in Chui, et al.

With respect to Claim 10, there is confusion over use of the same letter, "K," to represent quite different constants in the two inventions. The special constant "K=2" in the Chui, et al. patent is the constant of dilation for the scaling and wavelet functions common to virtually all wavelet decompositions. In contrast, the constant "K=2" in the instant invention is in no way related to wavelet theory and is especially not related to the scaling of wavelets. Instead, it represents a measure of overlapping of filters (in the case of K=2, 50% overlap). This latter K can take on a range of values, whereas the value of K=2 for wavelet scaling in the Chui, et al. invention is effectively not variable and part of the basic theory.

With respect to Claim 12, the responses to Claims 1, 9, and 10 are applicable. Therefore there is no need to repeat the foregoing arguments.

Applicants have also amended Claim 15, which is already allowed, for clarity. It is believed that the scope of the new wording is the same or narrower, that no new matter has been introduced into the claim, and that evident wording deficiencies have been eliminated.

Applicants have made a diligent effort to place the claims in condition for allowance. Reconsideration and further examination is therefore respectfully requested. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Frederick C. Williams, Applicants' Attorney at the telephone number listed below so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

Jan 31, 2001
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Date

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